Dyspareunia in the Context of Psychopathology, Personality Traits, and Coping Resources: Results From a Prospective Longitudinal Cohort Study From Age 30 to 50

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ORIGINAL PAPER

Dyspareunia in the Context of Psychopathology, Personality Traits, and Coping Resources: Results From a Prospective Longitudinal Cohort Study From Age 30 to 50

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Abstract Although dyspareunia has a major impact on sexual and general wellbeing, there are few data on the longitudinal development of its prevalence in representative study groups. Therefore, it was the aim of the present study to fill this gap by evaluating the prevalence of dyspareunia in a representative sample at age 30, 35, 41, and 50. Additional aims were to determine the association between dyspareunia, psychopathological covariates, personality characteristics, and coping resources. Semi-structured interviews with single-item questions on sexual problems in general as well as dyspareunia were used to gain information on 1-year as well as long-time prevalence rates. Psychopathological covariates were explored with the SCL-90-R. The Freiburger Personality Inventory (Freiburger Persönlichkeits Inventar, FPI) assessed personality characteristics. Scales of sense of mastery and self-esteem were used to investigate coping resources. Twelve months prevalence of dyspareunia varied between 4.5 and 6.4 % with a mean of 5.6 % and a long-time risk of 19.3 %. No relation between age and the prevalence rates was found. Dyspareunia was related to psychopathological covariates, especially depression. With respect to personality traits as measured with the FPI only nervousness showed a significant association with dyspareunia, whereas coping resources were unrelated. As dyspareunia is experienced by about 20 % of all women, it represents a frequent sexual problem. Therefore, assessment of dyspareunia should be integrated into primary care of women at any age and diagnostic as well as therapeutic strategies should be based on physiological and psychological factors.

Keywords Female sexual dysfunction · Dyspareunia · Age · Psychopathology · Personality traits · Longitudinal development

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Introduction

Sexual desire disorders and genital pain symptoms represent the most common female sexual disorders worldwide (Avellanet, Ortiz, Pando, & Romaguera, 2009; Glatt, Zinner, & McCormack, 1990; Oberg, Fugl-Meyer, & Fugl-Meyer, 2004). Dyspareunia, which is defined as recurrent or persistent pain associated with sexual intercourse (Basson et al., 2004), seriously interferes with women's well being (Danielsson, Sjöberg, Stenlund, & Wikman, 2003). Furthermore, dyspareunia may impair sexual health, for example lead to a reduced appraisal of sexual stimuli (Brauer, ter Kuile, & Laan, 2009a; Payne et al., 2007), lack of sexual desire/interest and reduced/lack of sexual arousal (Schultz et al., 2005). Even mild symptoms result in a lower frequency of sexual activity and intercourse (Glatt et al., 1990; Oberg et al., 2004). Chronic dyspareunia represents an important burden not only for the woman herself but also for the partnership (Nylanderlundqvist & Bergdahl, 2002). It is associated with an approximately twofold increased risk for low physical satisfaction, for low emotional satisfaction and for low

general happiness (Laumann, Paik, & Rosen, 1999). Moreover, dyspareunia may negatively influence health care practices. For example, pain associated with gynecological examinations may lead to avoidance of regular PAP smears and therefore early cancer diagnosis (Crowley, Goldmeier, & Hiller, 2009).

A variety of somatic factors such as not only vulvar vestibulitis syndrome, lichen sclerosus, but also endometriosis, pelvic varicosis etc. are known to result in either superficial or deep dyspareunia (Brotto, Basson, & Gehring, 2003; De Graaff et al., 2013). Also, central sensitization i.e., modified pain processing mechanisms, which result in an increased pain experience despite a low intensity pain stimulus, may be involved in the development of chronic dyspareunia (Schultz et al., 2005; van Lankveld et al., 2010). However, about 15 % of women suffer from chronic dyspareunia without any evident cause (Schultz et al., 2005). A combination of medical therapies addressing somatic causes of dyspareunia and manual techniques, biofeedback, as well as cognitive behavioral therapies aiming to relax and heighten awareness of the pelvic floor muscles has been successfully used to reduce dyspareunia (Basson & Smith, 2013; Bergeron et al., 2001; Bergeron, Khalifé, Glazer, & Binik, 2008; Schultz et al., 2005; van Lankveld et al., 2010).

Dyspareunia is a condition that is not well recognized by health-care professionals and, as a result, often remains either un- or insufficiently treated (Danielsson et al., 2003; Davis, Bergeron, Binik, & Lambert, 2013; Harlow & Stewart, 2003). Currently, about 50 % of the women suffering from dyspareunia experience neither spontaneous nor medically achieved improvement of their symptoms (Danielsson et al., 2003; Schultz et al., 2005). Consequently, awareness toward dyspareunia and treatment options need to be improved and more information on factors potentially predisposing, precipitating or maintaining dyspareunia is necessary.

Currently, although it is generally accepted that dyspareunia may lead to clinically relevant psychological burden (Schultz et al., 2005) there is conflicting result on whether dyspareunia is associated with specific psychopathology and/or with specific personality dimensions (Brauer, ter Kuile, Laan, & Trimbos, 2009b; Danielsson, Eisemann, Sjöberg, & Wikman, 2001; Dèttore, Pucciarelli, & Santarnecchi, 2013; Gates & Galask, 2001; Granot, Friedman, Yarnitsky, & Zimmer, 2002; Granot & Lavee, 2005; Khandker et al., 2011; Nylanderlundqvist & Bergdahl, 2002; Payne et al., 2007; Wylie, Hallam-Jones, & Harrington, 2004). Psychosocial variables for example the experience of stress has been found to influence sensitivity to pain (Chapman, Tuckett, & Song, 2008) and seems to significantly contribute to pain associated disability (Leeuw et al., 2007) as well as to increased vulnerability to developing a pain syndrome (Slade et al., 2007). Interestingly, psychological profiles seem not only to be associated with the development but also with the treatment outcome in the case of allodynia (Brotto et al., 2003). Health care providers need to better understand the role of psychopathological as well as personality factors and external factors such as coping strategies in the development of women's dyspareunia in order to optimize treatment options.

Therefore, the aim of the present study was to investigate the longitudinal development of 1-year prevalence rates for dyspareunia and its association with psychopathology, personality dimensions, and coping resources in a representative sample of women at age 30, 35, 41, and 50.

Method

Participants

Within the Zürich Study, a cohort of 2,346 representative women from the canton of Zürich, Switzerland, who were screened at age 20 in 1978 with the Symptom Checklist 90-R (SCL-90-R) (DeRogatis, 1977), was investigated repeatedly throughout a 30 year period. Fifty percent of the 20-year-old women from the complete electoral register of the canton of Zürich were randomly selected and received questionnaires by mail; 75 % of these sent back a completed questionnaire. For the second sampling phase, we applied a stratification procedure to enrich the interview sample with cases at risk for the development of psychiatric syndromes. Stratification was based on a cut-off value of the SCL-90-R global severity index (GSI) score, which was obtained in the initial screening-phase as specified above. That means that two-thirds of the final interview sample comprised randomly drawn high scorers (defined by the 85th percentile or above on SCL-90-R GSI scores) from the screening-sample of 4,547 subjects while the remaining third were randomly selected from the rest of the screening-sample (GSI scores below the 85th percentile). The GSI cut-off values were 1.89 for women. In all 299 women were chosen with this procedure. Such a two-phase procedure consisting of initial screening and subsequent interview with a stratified sub-sample is fairly common in epidemiological research (Dunn, Pickles, Tansella, & Vázquez-Barquero, 1999). Participants took part in a total of seven interviews starting at age 21 and ending at age 50. The response rate in relation to the first assessment at age 21 was 63.9 % at age 50. The initial allocation to the two groups below or above the 85th percentile of the GSI did not change over the study period, although dropouts were rather extremely high or low scorers on the GSI (Eich et al., 2003). No statistically significant differences with regard to socio-economic status and initial psychopathologic impairment according to the nine SCL-90-R subscales were found between study participants and dropouts.

The Zürich study was initially designed as a representative prospective epidemiologic study for the canton of Zürich to gain information on the long-term development of psychological, psychiatric, and psychosomatic disorders (Angst,

Dobler-Mikola, & Binder, 1984), which was funded by the Swiss national foundation. For further details of the study design, please refer to (Angst et al., 1984).

Measures

Interviews were conducted using the Structured Psychopathological Interview and Rating of the Social Consequences of Psychological Disturbances for Epidemiology (SPIKE) (Angst et al., 1984), a semi-structured interview developed for epidemiological surveys in psychiatric research. The primary objective of the Zürich cohort study was to investigate longitudinal development of psychiatric diseases in a representative sample (Angst et al., 1984; Eich et al., 2003). Sexual problems were discussed as one of about 30 psychiatric and somatic health topics of the SPIKE. In women we assessed dyspareunia four times from age 30 to 50 between 1988 and 2008. This resulted in 224 female study participants at age 30, 215 at age 35, 205 at age 41, and 191 at age 50.

Although sexually associated pain is relatively common, even for specialists it is difficult to establish a definitive diagnosis of dyspareunia (i.e., to differentiate between provoked vestibulodynia-vulvar pain resulting from touch/penetration plus allodynia of the introital rim), the introital/internal pain resulting from estrogen deficiency, vaginismus (an increased involuntary tone of the perivaginal muscles), and deep pelvic pain which may or may not ultimately be associated with pelvic pathology (Schultz et al., 2005; ter Kuile, van Lankveld, Vlieland, Willekes, & Weijenborg, 2005). Also, definitions used in publications on dyspareunia and provoked vestibulodynia vary greatly and the association with vaginismus as a primary or secondary condition is only rarely controlled for (Engman, Lindehammar, & Wijma, 2004). Often the underlying criteria for diagnosis are not presented (Engman et al., 2004). Therefore, for the current study definitions of sexual problems were based on the subjective perception of a sexual symptom as a problem. In 1988 sexual problems were explored with the question: "Were you dissatisfied with your sexual life or did you have any sexual problems during the past twelve months?" A positive answer was followed by questions to differentiate between "reduced or no sexual desire," "emotional problems during or after sexual intercourse," and/or "functional problems." To differentiate functional problems, women were asked whether they experienced "genito-pelvic pain associated with sexual intercourse" and/or "delayed or lack of orgasm."

Additionally, we evaluated associations between dyspareunia and psychopathology with the subscales of the SCL-90-R, where subjects indicated psychopathological symptoms according to a five-point Likert scale that ranges from (1) "not at all" to (5) "extremely." The SCL-90-R covered the most recent four-week period of psychopathology at each time of measurement. Its 90 items are grouped along nine subscales that represent (1) anxiety, (2) depression, (3) hostility, (4) interpersonal sensitivity, (5) obsessive–compulsive symptoms, (6) paranoid ideation, (7) phobic anxiety, (8) psychoticism, and (9) somatization as defined in the manual of the SCL-90-R (DeRogatis, 1977). For example paranoid ideation reflects clinical features of projective thought, hostility, grandiosity, suspiciousness, centrality as well as fear of loss of autonomy and is defined by the sum of the items 8, 18, 43, 68, 76, and 83. The items 6, 21, 34, 36, 37, 41, 61, 69, and 73 represent interpersonal sensitivity. This dimension measures feelings of inadequacy and inferiority, particularly in comparison to other people, self-deprecation, self-doubt, and marked discomfort during interpersonal interactions. The SCL-90-R has historically shown good internal consistency and test–retest reliability (Schmitz et al., 2000; Vodermaier, Linden, & Siu, 2009), although the validity in terms of factor structure of the dimensions has led to contradictory results (Olsen, Mortensen, & Bech, 2004; Schmitz et al., 2000). In the present study, the internal consistency was acceptable for all subcales at any assessment wave included in the analysis, that is, 1988, 1993, 1999, and 2008. All Cronbach's α were greater than 0.7 and very stable across measurement occasions. For instance, in 1988 α values ranged from 0.74 for psychoticism up to 0.90 for depression (mean $\alpha = 0.82$).

Participants' personality traits were evaluated with the Freiburger Personality Inventory (FPI) (Fahrenberg, Hampel, & Selg, 1984) during the interview from 1988. The FPI is a popular German inventory, which has been constructed on the basis of theoretically founded personality traits and depicts personality traits on nine distinct subscales. Those primary traits are (1) nervousness, (2) aggressiveness, (3) depressiveness, (4) irritability, (5) sociability, (6) resiliency, (7) dominance, (8) inhibition, and (9) openness. Nervousness describes the tendency to get easily excited and experience somatic affections of vegetative nature (circulation, respiration, physical agitation). The FPI has shown good reliability and validity (Fahrenberg et al., 1984). In the present study, Cronbach's α ranged from 0.49 for depressiveness up to 0.71 for resiliency (mean $\alpha = 0.56$). That may appear low, but was expected for scales that are composed of various heterogeneous behaviors.

As coping resources are likely to influence the association between psychopathology and dyspareunia, the investigation of coping resources was included in the present study. Therefore, the well-established scales of sense of mastery and self-esteem from work by Pearlin and Schooler (1978), assessed during the interview in 1986, were incorporated. Sense of mastery describes the extent to which a subject is convinced that he has control and influence over personal life events and problems (e.g., "I have little control over the things that happen to me"). Self-esteem measures a subject's positive attitude and confidence toward oneself (e.g., "I feel that I have a number of good qualities"). The mastery subscale comprises seven items; the self-esteem subscale six. All questions were rated on a four-point Likert scale

ranging from (1) "completely agree" to (4) "completely disagree." The two subscales have shown good reliability and validity in earlier studies (Hobfoll & Walfisch, 1984; Pearlin & Schooler, 1978). In the present study, the internal consistency of both scales was acceptable ($\alpha = 0.72$ and 0.75 for mastery and self-esteem, respectively).

According to the legal regulations for the realization of clinical studies in the canton of Zürich, Switzerland in effect at the initiation of the study, study participants were informed by the professional interviewers of the aim of the study and the confidentiality of their data. Informed consent was based on the declaration of Helsinki. Participants were informed that they could refrain from participation and have their data deleted at any time.

Statistical Analysis

Prevalence rates were weighted to adjust for the sample stratification (see also sampling) by applying the SURVEYFREQ procedure of SAS version 9 for Windows. This procedure uses probability weights to compute unbiased standard errors and confidence intervals. We then obtained estimates representative for the general population of the canton of Zürich. Associations between sexual problems and the within-subject effects of age/time and various covariates were analyzed with a series of generalized estimating equations (GEE) using SPSS 20 for Macintosh. GEE analyses were introduced to fit regression models that account for within-subject correlation, which is an inherent part of longitudinal studies that rely on repeated measures (Zeger, Liang, & Albert, 1988). Intercept and slope were included in all GEE models, which are a standard procedure in longitudinal studies (Twisk, 2003). Dyspareunia (present vs. absent) was entered as the dependent variable, thus we fitted models with binomial distribution and logit-link function. The within-subject covariance structure was specified with the "unstructured" correlation type to avoid having any constraints on the covariance structure. All continuous predictors were standardized using the z-transformation to ease the interpretability and comparability of the results. The GEE were conducted using un-weighted data and two-tailed significance testing. A p value less than .05 was considered as statistically significant in all analyses.

Results

Out of 224 women that participated in the assessment wave in 1988 at age 30, a total of 76.8 % had previously been married up to the last assessment in 2008 at age 50. Altogether 27.7 % were ever divorced and 66.8 % had children. A low, intermediate, and high education level was reported by 31.2, 37.7, and 31.2 %, respectively. Finally, the weighted cumulative 12-month prevalence rate of mood disorders based on the SPIKE results in this sample was 44.6 % and that of an anxiety disorder 54.4 %.

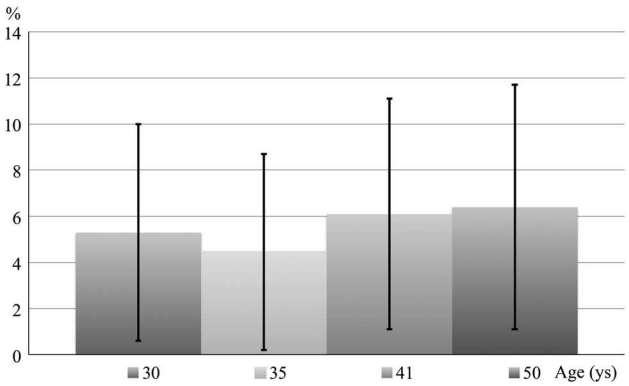

Fig. 1 Percentage of women reporting dyspareunia in different age categories

Table 1 Longitudinal associations of dyspareunia with psychopathological covariates (SCL-90-R subscales)

Psychopathology	b (95 % CI)	p
Anxiety	0.161 (−0.068; 0.390)	.17
Depression	0.398 (0.185; 0.612)	.00
Hostility	0.143 (−0.102; 0.387)	.25
Interpersonal sensitivity	0.253 (0.031; 0.476)	.03
Obsessive–compulsive	0.229 (−0.007; 0.465)	.06
Paranoid ideation	0.355 (0.113; 0.596)	.00
Phobic anxiety	0.074 (−0.152; 0.299)	.52
Psychoticism	0.353 (0.127; 0.579)	.00
Somatization	0.245 (0.055; 0.436)	.01

SCL symptom checklist

At age 30 20.2 % of the women investigated in total reported any sexual problem. One-year prevalences for sexual problems at age 35, 41, and 50 were 26.1, 32.9, and 25.2 %, respectively.

Figure 1 shows the 1-year prevalence of dyspareunia. Dyspareunia in females was quite stable over time and affected 5.6 % of the population on average. Variation over time, i.e., the correlation with age, was not statistically significant (Wald $\chi^2 = 2.032$ (df = 3), $p > .05$). The respective cumulative incidence rate for dyspareunia, which approximately corresponds to the long-time risk, was 19.3 %. Dyspareunia represented 26.2 % of all reported sexual problems at age 30, 17.2 % at age 35, 18.5 % at age 41, and 25.4 % at age 50.

The longitudinal associations between dyspareunia with psychopathological and personality covariates as well as with coping resources are presented in Tables 1 and 2. Overall, various psychopathological covariates as assessed with the SCL-90-R were modestly associated with the occurrence dyspareunia. Depression was the psychopathological covariate most strongly related to dyspareunia ($b = 0.398$). Dyspareunia also showed a weak association with a variety of psychopathological factors such as greater interpersonal sensitivity, paranoid ideation, and psychoticism. All those associations corresponded to

Table 2 Longitudinal associations of dyspareunia with personality (Freiburg Personality Inventory subscales) and coping covariates

	b (95 % CI)	*p*
Personality		
Nervousness	0.326 (0.010; 0.643)	.04
Aggressiveness	0.023 (−0.272; 0.318)	.88
Depressiveness	0.236 (−0.028; 0.500)	.08
Irritability	0.120 (−0.190; 0.429)	.45
Sociability	−0.156 (−0.481; 0.168)	.35
Resiliency	−0.119 (−0.424; 0.185)	.44
Dominance	−0.014 (−0.302; 0.273)	.92
Inhibition	0.170 (−0.160; 0.500)	.31
Openness	0.224 (−0.123; 0.571)	.21
Coping resources		
Self-esteem	0.159 (−0.152; 0.471)	.32
Sense of mastery	−0.104 (−0.397; 0.189)	.49

small-to-medium effect sizes ($0.2 < b < 0.5$) Anxiety, phobic anxiety, and hostility showed were not associated with dyspareunia (all $b < 0.2$).

The associations between personality traits measured with the FPI and dyspareunia revealed that only nervousness represented a significant covariate ($b = 0.326$; corresponding to a small-to-medium effect size). Finally, no significant association was found between coping resources and dyspareunia (see Table 2).

Discussion

In the Zürich cohort study, 1-year prevalences of dyspareunia affected 5.6 % of the female population on average and accounted for one-fifth of the sexual problems reported. Prevalence estimates in the general population at different ages range from 2 to 21 % (Danielsson et al., 2003; Hayes et al., 2008; Landry & Bergeron, 2009; Laumann et al., 1999; Simons & Carey, 2001). A population-based sample from five ethnically different Boston communities reported histories of vulvar pain lasting at least 3 months in 16 % of the study participants and nearly 7 % experienced such pain at the time of the study (Harlow & Stewart, 2003). In a global investigation of 40- to 80-year-old women in 29 countries worldwide, but with a response rate of only 19 %, Northern European countries had the lowest point prevalence (5 %), while the Southeast Asian countries had the highest (22 %) rates of dyspareunia (Laumann et al., 2005). The current data, based on Zürich inhabitants, present prevalences on the lower end of worldwide prevalences for dyspareunia. The cumulative incidence (i.e., long-time risk) of 19.3 % found in Zürich was far higher than the 3 % reported by others (Líndal & Stefànsson, 1993). However, they investigated study participants at age 55–57, while the Zürich cohort was evaluated using a longitudinal design from age 30 to age 50. As the study from Iceland retrospectively investigated the lifetime prevalence, women might have forgotten experiences of dyspareunia at younger ages, which could explain differences in results. In contrast, Glatt et al. (1990) reported a lifetime prevalence of 27.5 % for dyspareunia, which was more than 8 % higher than the cumulative incidence found in Zürich. This difference might have to be attributed to the limitation of the Zürich investigation to a period of 20 years. When DSM-IV-TR (American Psychiatric Association, 2000) criteria are used, i.e., when pain that is associated exclusively with lack of lubrication or vaginismus is excluded, the prevalence estimated in general practice settings is around 3 % (Heisterberg, 1993; Simons & Carey, 2001), which approximates the current findings.

In the Zürich study, dyspareunia was quite stable over time, which is in agreement with results from several clinical samples (Jamieson & Steege, 1996; Sobhgol & Alizadeli Charndabee, 2007) as well as a representative national study of Swedish women between age 18 and 65 (Oberg et al., 2004). Dyspareunia may result from a variety of age-related disorders, e.g., candida vaginitis or provoked vulvodynia, and studies often are not controlled for lubrication difficulties, which are more prominent in postmenopausal women (Lara et al., 2009). Therefore, definitions of dyspareunia are an important confounder in the investigation of the correlation between age and the prevalence of dyspareunia. However, our results show in agreement with those of others that although reasons for pain may differ, dyspareunia should be assessed in women irrespective of their age.

The time span addressed in the Zürich study corresponds well to those of other studies (Glatt et al., 1990; Oberg et al., 2004). In accordance with Danielsson et al. (2003), in Zürich each woman decided whether she regarded her symptoms as problematic or not. Results from Oberg et al. (2004) showed that perceiving dyspareunia as distressing is associated with the frequency of this symptom. As we did not define a specific duration of symptoms for the diagnosis of dyspareunia, this methodological approach might explain further differences in comparison with other studies. Also, cultural changes toward sexual disorders i.e., improved access to medical care, increasing openness toward the discussion of sexual problems as well as eventually higher awareness of physicians toward these problems throughout the 20 year study period might have influenced the longitudinal development of prevalences in the Zürich study.

Psychopathology

In agreement with other studies (Basson & Schultz, 2007; Wylie et al., 2004) several psychopathological covariates in the Zürich cohort were associated with dyspareunia. Two of the most commonly investigated psychopathological factors in the context of dyspareunia are depression and anxiety. Supporting the results from the Zürich study, in several controlled studies women presenting with provoked vestibulodynia or dyspareunia

had higher depression scores than non-afflicted women (Gates & Galask, 2001; Jantos & White, 1997; Nylanderlundqvist & Bergdahl, 2002; Reed et al., 2000; Sackett, Gates, Heckman-Stone, Kobus, & Galask, 2001; Schultz et al., 2005; van Lankveld & Grotjohann, 2000). Jantos and White (1997) attributed part of the high levels of depression found in women with vulvodynia to perfectionistic tendencies. While women presenting dyspareunia and provoked vestibulodynia were found to have significantly increased depression rates, data on vaginismus are conflicting (Basson et al., 2004; Schultz et al., 2005). In three studies, no difference on depression scores was found in women with dyspareunia compared to control women. Methodological differences, including the exclusion of women taking medications (Aikens, Reed, Gorenflo, & Haefner, 2003), or the choice of the study population (Meana, Binik, Khalife, & Cohen, 1997; Payne et al., 2007), likely explain these differences. Whereas some have concluded that depression may be primary and not only secondary to pain (Nylanderlundqvist & Bergdahl, 2002), others have shown a reduction of depressive symptoms in women with provoked vestibulodynia after treatment (physical, sex/psychotherapy and/or medical therapy) in comparison to non-treated women, although there was significant reduction in pain over the 2-year follow-up even in the non-treated group (Davis et al., 2013). Recent results from a high quality case control study demonstrate that a history of depression is not only associated with a four-fold increased risk for vulvodynia but also that vulvodynia represents a risk factor for new or recurrent mood disorder (Khandker et al., 2011).

Whereas some studies have not found an association between dyspareunia and anxiety (Brauer, Laan, & ter Kuile, 2006; Dèttore et al., 2013; Granot, Zisman-Ilani, Ram, Goldstick, & Yovell, 2011; Nylanderlundqvist & Bergdahl, 2002; Payne et al., 2007), others have found the opposite to be true (Brauer et al., 2009b; Danielsson et al., 2001; Granot & Lavee, 2005; van Lankveld & Grotjohann, 2000; Wylie et al., 2004). Part of these differences might be explained by the fact that not all women with dyspareunia demonstrate high anxiety, suggesting that there are individual differences in anxiety related to the pathogenesis of sexuality-associated pain (Granot & Lavee, 2005). A report from a group of specialists in sexual medicine concludes that most of the studies support an association between anxiety disorders and dyspareunia, provoked vestibulodynia as well as vaginismus (Basson et al., 2004; Basson & Schultz, 2007; Nunns & Mandal, 1997; Schultz et al., 2005). However, anxiety may be a risk factor as well as a consequence of vulvodynia (Khandker et al., 2011). Biologic mechanisms postulated to be involved in the underlying pathophysiology are changes in the central nervous, endocrine, and immune regulation induced by psychological stressors (Glaser & Kiecolt-Glaser, 2005). Also anxiety might add to the hypervigilance for coital pain and selective attention bias toward pain stimuli (Payne, Binik, Amsel, & Khalifé, 2005). Interestingly, anxiety in general as well as anxiety surrounding body exposure during sexual activity was found to be higher in women with primary compared to secondary vestibulodynia i.e., vulvodynia developing after a period of pain-free intercourse (Granot, Friedman, Yarnitsky, Tamir, & Zimmer, 2004; Sutton, Pukall, & Chamberlain, 2009). These results give emphasis to the hypothesis that anxiety might not only be a result of provoked vestibulodynia, but might be involved in the development of pain symptoms.

In the Zürich study, phobic anxiety was not related to dyspareunia, which is in accordance with results from several other reports, including a review from an expert panel (Azar, Noohi, & Shafiee Kandjani, 2007; Basson et al., 2004). In contrast, a higher level of phobic anxiety in women suffering from dyspareunia/vulvodynia has been reported by others (Desrochers, Bergeron, Landry, & Jodoin, 2008; Granot & Lavee, 2005; Meana & Lykins, 2009; van Lankveld & Grotjohann, 2000; Wylie et al., 2004). Also, some have found increased phobic anxiety in women with provoked vestibulodynia (Brotto et al., 2003). As the association seems to be particularly strong for provoked vestibulodynia, the composition of the Zürich cohort (i.e., including women with superficial and deep dyspareunia) may mask such a correlation.

In Zürich, dyspareunia was related to interpersonal sensitivity (social anxiety) to some degree, which is in agreement with results on dyspareunia, vulvodynia, provoked vestibulodynia, and vaginismus reported by others (Basson et al., 2004; van Lankveld & Grotjohann, 2000; Wylie et al., 2004). Also, provoked vestibulodynia was more common in women experiencing a higher level of fear of negative evaluation by others (Brotto et al., 2003). Interestingly, such a fear of negative evaluations seems to be more important for women suffering from vulvar vestibulitis syndrome than in women seeking help for orgasmic problems (Brotto et al., 2003).

In contrast to results from the several very well designed studies (Basson et al., 2004; van Lankveld & Grotjohann, 2000; Wylie et al., 2004), no association with obsessive–compulsive features could be demonstrated for dyspareunia in Zürich. Although several of these studies used the same questionnaire to investigate obsessive–compulsive disorders methodological e.g., differences in study samples, study design, definitions of dyspareunia, etc., might explain these findings.

The Zürich study shows an association between paranoid ideation and dyspareunia, which corresponds well to results on vulvodynia patients and control women (Wylie et al., 2004).

Somatization is one of the major psychological factors related to chronic pain syndromes (Granot et al., 2011). Results from other reports are in agreement with the association between dyspareunia and somatization found in Zürich (Azar et al., 2007; Basson et al., 2004; Brauer et al., 2009b; Farina, Mazzotti, Pasquini, & Mantione, 2011; Granot et al., 2011), as well as between vulvodynia/vestibulodynia and somatization (Basson et al., 2004; Danielsson et al., 2001; Granot & Lavee, 2005; Wylie et al., 2004) or vulvar vestibulitis and somatic preoccupation/somatization (Nylanderlundqvist & Bergdahl, 2002; Schmidt

et al., 2001; van Lankveld, Weijenborg, & ter Kuile, 1996). According to some, the higher number of somatic symptoms and complaints in women with provoked vestibulodynia (Danielsson, Sjöberg, & Wikman, 2000) supports the concept of a psychosomatic element in provoked vestibulodynia. However, there seem to be individual differences in the connection between sexual pain syndromes and somatization (Granot & Lavee, 2005).

An expert panel based on studies available in 2005 concluded that hostility appears to be more frequently present in women with dyspareunia (Schultz et al., 2005). Also, hostility was found in a British study group of women suffering from vulvodynia (Wylie et al., 2004). However, the women investigated in Zürich showed no association between hostility and dyspareunia.

Personality

In agreement with results from Danielsson et al. (2001), in the Zürich study no relation between most of the personality traits and dyspareunia could be demonstrated. In contrast, other research groups have found associations between dyspareunia/vulvodynia and personality traits such as aggression, self-focused attention, negative self-evaluation, neuroticism, low levels of extraversion, and agreeableness (Azar et al., 2007; Meana & Lykins, 2009; Schultz et al., 2005). Further studies indicated that women with dyspareunia obtain higher scores than controls concerning a harm-avoidance, reward dependent (reinforcement dependence) and self-directedness (tendency to attribute behaviors or events to external causes out of our control) trait (Desrochers et al., 2008; Granot & Lavee, 2005; Nylanderlundqvist & Bergdahl, 2002). Also women with provoked vestibulodynia have been characterized to be more cautious, careful, insecure, and pessimistic (Lundqvist & Bergdahl, 2005). In the present study, only nervousness was associated with the development of dyspareunia. Unfortunately, no other study investigated nervousness in the context of dyspareunia. As the present study examined a representative group i.e., is not limited to women seeking medical support to deal with sexually-associated pain, differences in study groups might explain these conflicting findings. Also differences in questionnaires used to evaluate personality factors will add to the inhomogeneity of the presented study results.

Coping

Although pain seems to play a role in regulating intimacy and could therefore theoretically be involved in coping with psychologically difficult situations, for example by facilitating attention from caregivers and establishing a sense of security (Granot et al., 2011), no association could be demonstrated between coping resources and dyspareunia in the Zürich cohort study. However, several studies emphasize the relevance of specific cognitive reactions toward pain (i.e., enhanced pain catastrophizing, pain-related fear, and hypervigilance to pain) in women with vulvodynia (Brauer et al., 2009b; Meana & Lykins, 2009; Payne et al., 2005).

Clinical Implications

As several psychopathological and personality factors were found to be associated with sexually associated pain, they represent important foci in the treatment of such disorders. Therefore, women with dyspareunia should be physically and psychologically examined. For example, depression should be addressed in the context of dyspareunia. In case of psychopathology, psychotherapy should be offered in order to improve actual dysfunction.

As an increased vulnerability in intimate relations might similarly represent a risk factor in the development of depression and anxiety (Lundqvist & Bergdahl, 2005), such an approach might not only improve sexual dysfunction, but also reduce the risk for psychiatric morbidity. Also, sexual function should be addressed in a psychiatric evaluation when detecting psychological/personality factors, which seem to be related to dyspareunia. Last but not least women should be supported to adapt their sexual activities to their psychological as well as physiological needs to overcome the serious impact of sexuality-associated pain on their sexual and general health.

Strengths and Limitations

To the best of our knowledge, no previous study observing the development of dyspareunia in a longitudinal design has been published. Studies without a longitudinal design are hampered by recall inaccuracy or bias, i.e., depending on the severity of the symptoms women underestimate their medical problems retrospectively, or do not remember exactly when the problem occurred (Danielsson et al., 2003). As the presented results are drawn from longitudinally collected data, a difference between younger and older women with regard to their openness toward the discussion of sexual issues is unlikely to have biased the results. One advantage of the present study is the evaluation of a representative sample of the population of the canton Zürich independent of whether they seek help to deal with dyspareunia or not, which excludes the composition of the study group as a confounder. However, cantons in Switzerland differ with regard to population density, rural/urban population, quantity, and type of industry, language, so that results cannot be generalized for all Switzerland. Our response rate of 57 % at the latest investigation was higher than those achieved in other studies on sexual problems/disorders (Hayes et al., 2008; Leiblum, Koochaki, Rodenberg, Barton, & Rosen, 2006; Moreira, Hartmann, Glasser, Gingell, & GSSAB Investigators' Group, 2005). As dyspareunia may lead to avoidance of

sexual activities, we did not exclude women based on their lack of sexual activity during the year prior to each interview, an approach which has also been used by Danielsson et al. (2003). Therefore differences might have been stronger than in the comparison of only sexual active women i.e., restricting the analysis to women with intensities of dyspareunia permitting sexual intercourse. The investigation of sexual problems was part of a broad representative investigation of somatic and psychiatric diseases. Therefore, we decided to use single-item questions to explore dyspareunia. Single-item questions have also been successfully used in other large studies (Christensen et al., 2011; Hayes et al., 2008; Oberg et al., 2004; Rosen et al., 2004); however, a more detailed investigation could have led to higher prevalences. By asking directly for sexual problems within the interviews, we aimed to reduce non-disclosure resulting from not daring to bring up this topic (van Lankveld et al., 2010). An important limitation of the study is that while dyspareunia and psychopathology were investigated at each time-point, personality factors and coping strategies were only investigated once. Although personality characteristics are considered to be relatively stable, it cannot be excluded that there have been changes throughout the study period. Because no gynecological examination was performed, a differentiation between vestibulodynia and any other subtype of dyspareunia was not possible. The comparison of the presented results with findings from others was hampered by the still difficult differentiation between sexual pain disorders and consequently different definitions used in various studies (Schultz et al., 2005; van Lankveld et al., 2010). As we did not control for hormone therapies, our results represent the actual situation in the general female population independent from any therapy used to reduce dyspareunia. The influence of hormonal therapy on dyspareunia could therefore not be evaluated. As the average age for menopause is currently 52 years, a lack of lubrication due to insufficient estrogen levels is unlikely to have influenced our results to a significant degree.

Conclusion

In the Zürich study, approximately one out of five women experienced dyspareunia. Several psychopathological covariates i.e., depression, interpersonal sensitivity (social anxiety), paranoid ideation, and somatization were associated with the prevalence of dyspareunia, while except nervousness neither personality characteristics nor coping resources were related to this sexual disorder. Prevalences did not vary in relation to age. As dyspareunia seriously impairs sexual and general wellbeing/health, diagnostic and therapeutic approaches should be based on a bio-psycho-social model i.e., include potential physical as well as psychological factors influencing the development of this disorder in order to use all relevant and available resources for an optimized treatment outcome.

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References

Aikens, J. E. J., Reed, B. D. B., Gorenflo, D. W. D., & Haefner, H. K. H. (2003). Depressive symptoms among women with vulvar dysesthesia. *American Journal of Obstetrics and Gynecology, 189*, 462–466. doi:10.1067/S0002-9378(03)00521-0.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Angst, J., Dobler-Mikola, A., & Binder, J. (1984). The Zurich study—A prospective epidemiological study of depressive, neurotic and psychosomatic syndromes. I. Problem, methodology. *European Archives of Psychiatry and Neurological Sciences, 234*, 13–20.

Avellanet, Y. R., Ortiz, A. P., Pando, J. R., & Romaguera, J. (2009). Dyspareunia in Puerto Rican middle-aged women. *Menopause, 16*, 742–747. doi:10.1097/gme.0b013e31819724f0.

Azar, M., Noohi, S., & Kandjani, A. R. S. S. (2007). Relationship between female sexual difficulties and mental health in patients referred to two public and private settings in Tehran, Iran. *Journal of Sexual Medicine, 4*, 1262–1268. doi:10.1111/j.1743-6109.2007.00544.x.

Basson, R., Leiblum, S., Brotto, L., Derogatis, L., Fourcroy, J., Fugl-Meyer, K., … Schultz, W. W. (2004). Revised definitions of women's sexual dysfunction. *Journal of Sexual Medicine*, *1*, 40–48. doi:10.1111/j.1743-6109.2004.10107.x.

Basson, R., & Schultz, W. W. (2007). Sexual sequelae of general medical disorders. *Lancet, 369*, 409–424. doi:10.1016/S0140-6736(07)60197-4.

Basson, R., Schultz, W. C. M. W., Binik, Y. M., Brotto, L. A., Eschenbach, E., Laan, W. H., … Redmond, G. (2004). Women's sexual desire and arousal disorders and sexual pain. In T. F. Lue, R. Basson, R. Rosen, F. Giuliano, S. Khoury, & F. Montorsi (Eds.), *Sexual medicine: Sexual dysfunctionin men and women. 2nd International Consultation on sexual dysfunctions*. Paris: Health Publications.

Basson, R., & Smith, K. B. (2013). Incorporating mindfulness meditation into the treatment of provoked vestibulodynia. *Current Sexual Health Reports, 6*, 20–29. doi:10.1007/s11930-013-0008-0.

Bergeron, S., Binik, Y. M., Khalifé, S., Pagidas, K., Glazer, H. I., Meana, M., et al. (2001). A randomized comparison of group cognitive–behavioral therapy, surface electromyographic biofeedback, and vestibulectomy in the treatment of dyspareunia resulting from vulvar vestibulitis. *Pain, 91*, 297–306.

Bergeron, S., Khalifé, S., Glazer, H. I., & Binik, Y. M. (2008). Surgical and behavioral treatments for vestibulodynia: Two-and-one-half year follow-up and predictors of outcome. *Obstetrics and Gynecology, 111*, 159–166. doi:10.1097/01.AOG.0000295864.76032.a7.

Brauer, M. M., Laan, E. E., & ter Kuile, M. M. (2006). Sexual arousal in women with superficial dyspareunia. *Archives of Sexual Behavior, 35*, 191–200. doi:10.1007/s10508-005-9001-7.

Brauer, M., ter Kuile, M. M., & Laan, E. (2009a). Effects of appraisal of sexual stimuli on sexual arousal in women with and without superficial dyspareunia. *Archives of Sexual Behavior, 38*, 476–485. doi:10.1007/s10508-008-9371-8.

Brauer, M., ter Kuile, M. M., Laan, E., & Trimbos, B. (2009b). Cognitive-affective correlates and predictors of superficial dyspareunia. *Journal of Sex and Marital Therapy, 35*, 1–24. doi:10.1080/00926230802525604.

Brotto, L. A., Basson, R., & Gehring, D. (2003). Psychological profiles among women with vulvar vestibulitis syndrome: A chart review. *Journal of Psychosomatic Obstetrics and Gynaecology, 24*, 195–203.

Chapman, C. R., Tuckett, R. P., & Song, C. W. (2008). Pain and stress in a systems perspective: Reciprocal neural, endocrine, and immune

interactions. *Journal of Pain, 9*, 122–145. doi:10.1016/j.jpain.2007.09.006.

Christensen, B. S., Grønbaek, M., Osler, M., Pedersen, B. V., Graugaard, C., & Frisch, M. (2011). Associations between physical and mental health problems and sexual dysfunctions in sexually active Danes. *Journal of Sexual Medicine, 8*, 1890–1902. doi:10.1111/j.1743-6109.2010.02145.x.

Crowley, T., Goldmeier, D., & Hiller, J. (2009). Diagnosing and managing vaginismus. *British Medical Journal, 338*, b2284.

Danielsson, I., Eisemann, M., Sjöberg, I., & Wikman, M. (2001). Vulvar vestibulitis: A multi-factorial condition. *British Journal of Obstetrics and Gynaecology, 108*, 456–461.

Danielsson, I., Sjöberg, I., Stenlund, H., & Wikman, M. (2003). Prevalence and incidence of prolonged and severe dyspareunia in women: results from a population study. *Scandinavian Journal of Public Health, 31*, 113–118. doi:10.1080/14034940210134040.

Danielsson, I. I., Sjöberg, I. I., & Wikman, M. M. (2000). Vulvar vestibulitis: Medical, psychosexual and psychosocial aspects, a case–control study. *Acta Obstetricia et Gynecologica Scandinavica, 79*, 872–878. doi:10.3109/00016340009169218.

Davis, S. N. P., Bergeron, S., Binik, Y. M., & Lambert, B. (2013). Women with provoked vestibulodynia experience clinically significant reductions in pain regardless of treatment: results from a 2-year follow-up study. *Journal of Sexual Medicine, 10*, 3080–3087. doi:10.1111/jsm.12309.

De Graaff, A. A., D'Hooghe, T. M., Dunselman, G. A. J., Dirksen, C. D., Hummelshoj, L., WERF EndoCost Consortium, et al. (2013). The significant effect of endometriosis on physical, mental and social wellbeing: Results from an international cross-sectional survey. *Human Reproduction, 28*, 2677–2685. doi:10.1093/humrep/det284.

DeRogatis, L. R. (1977). *Symptom Checklist 90, R-Version manual I: Scoring administration and procedures for the SCL-90*. Baltimore: John Hopkins Press.

Desrochers, G., Bergeron, S., Landry, T., & Jodoin, M. (2008). Do psychosexual factors play a role in the etiology of provoked vestibulodynia? A critical review. *Journal of Sex and Marital Therapy, 34*, 198–226. doi:10.1080/00926230701866083.

Dèttore, D., Pucciarelli, M., & Santarnecchi, E. (2013). Anxiety and female sexual functioning: An empirical study. *Journal of Sex and Marital Therapy, 39*, 216–240. doi:10.1080/0092623X.2011.606879.

Dunn, G., Pickles, A., Tansella, M., & Vázquez-Barquero, J. L. (1999). Two-phase epidemiological surveys in psychiatric research. *British Journal of Psychiatry, 174*, 95–100.

Eich, D., Ajdacic-Gross, V., Condrau, M., Huber, H., Gamma, A., Angst, J., et al. (2003). The Zurich Study: participation patterns and Symptom Checklist 90-R scores in six interviews, 1979–99. *Acta Psychiatrica Scandinavica. Supplementum, 418*, 11–14.

Engman, M., Lindehammar, H., & Wijma, B. (2004). Surface electromyography diagnostics in women with partial vaginismus with or without vulvar vestibulitis and in asymptomatic women. *Journal of Psychosomatic Obstetrics and Gynaecology, 25*, 281–294.

Fahrenberg, J., Hampel, R., & Selg, H. (1984). *Fahrenberg: Das Freiburger Persönlichkeitsinventar.* Revised version FPI-R and FPI-A1. Fourth partially revised edition. Göttingen: Hogreve.

Farina, B., Mazzotti, E., Pasquini, P., & Mantione, M. G. (2011). Somatoform and psychoform dissociation among women with orgasmic and sexual pain disorders. *Journal of Trauma & Dissociation, 12*, 526–534. doi:10.1080/15299732.2011.598124.

Gates, E. A., & Galask, R. P. (2001). Psychological and sexual functioning in women with vulvar vestibulitis. *Journal of Psychosomatic Obstetrics and Gynaecology, 22*, 221–228.

Glaser, R., & Kiecolt-Glaser, J. K. (2005). Stress-induced immune dysfunction: Implications for health. *Nature Reviews Immunology, 5*, 243–251. doi:10.1038/nri1571.

Glatt, A. E. A., Zinner, S. H. S., & McCormack, W. M. W. (1990). The prevalence of dyspareunia. *Obstetrics and Gynecology, 75*, 433–436.

Granot, M., Friedman, M., Yarnitsky, D., Tamir, A., & Zimmer, E. Z. (2004). Primary and secondary vulvar vestibulitis syndrome: Systemic pain perception and psychophysical characteristics. *American Journal of Obstetrics and Gynecology, 191*, 138–142. doi:10.1016/j.ajog.2003.09.060.

Granot, M., Friedman, M., Yarnitsky, D., & Zimmer, E. Z. (2002). Enhancement of the perception of systemic pain in women with vulvar vestibulitis. *British Journal of Obstetrics and Gynaecology, 109*, 863–866.

Granot, M., & Lavee, Y. (2005). Psychological factors associated with perception of experimental pain in vulvar vestibulitis syndrome. *Journal of Sex and Marital Therapy, 31*, 285–302. doi:10.1080/00926230590950208.

Granot, M., Zisman-Ilani, Y., Ram, E., Goldstick, O., & Yovell, Y. (2011). Characteristics of attachment style in women with dyspareunia. *Journal of Sex and Marital Therapy, 37*, 1–16. doi:10.1080/0092623X.2011.533563.

Harlow, B. L., & Stewart, E. G. (2003). A population-based assessment of chronic unexplained vulvar pain: have we underestimated the prevalence of vulvodynia? *Journal of the American Medical Women's Association, 58*, 82–88.

Hayes, R. D., Dennerstein, L., Bennett, C. M., Sidat, M., Gurrin, L. C., & Fairley, C. K. (2008). Risk factors for female sexual dysfunction in the general population: exploring factors associated with low sexual function and sexual distress. *Journal of Sexual Medicine, 5*, 1681–1693. doi:10.1111/j.1743-6109.2008.00838.x.

Heisterberg, L. (1993). Factors influencing spontaneous abortion, dyspareunia, dysmenorrhea, and pelvic pain. *Obstetrics and Gynecology, 81*, 594–597.

Hobfoll, S. E., & Walfisch, S. (1984). Coping with a threat to life: a longitudinal study of self-concept, social support, and psychological distress. *American Journal of Community Psychology, 12*, 87–100.

Jamieson, D. J., & Steege, J. F. (1996). The prevalence of dysmenorrhea, dyspareunia, pelvic pain, and irritable bowel syndrome in primary care practices. *Obstetrics and Gynecology, 87*, 55–58. doi:10.1016/0029-7844(95)00360-6.

Jantos, M., & White, G. (1997). The vestibulitis syndrome: Medical and psychosexual assessment of a cohort of patients. *Journal of Reproductive Medicine, 42*, 145–152.

Khandker, M., Brady, S. S., Vitonis, A. F., MacLehose, R. F., Stewart, E. G., & Harlow, B. L. (2011). The influence of depression and anxiety on risk of adult onset vulvodynia. *Journal of Women's Health, 20*, 1445–1451. doi:10.1089/jwh.2010.2661.

Landry, T., & Bergeron, S. (2009). How young does vulvo-vaginal pain begin? Prevalence and characteristics of dyspareunia in adolescents. *Journal of Sexual Medicine, 6*, 927–935. doi:10.1111/j.1743-6109.2008.01166.x.

Lara, L. A., Useche, B., Ferriani, R. A., Reis, R. M., de Sa, M. F., de Freitas, M. M., et al. (2009). The effects of hypoestrogenism on the vaginal wall: Interference with the normal sexual response. *Journal of Sexual Medicine, 6*, 30–39. doi:10.1111/j.1743-6109.2008.01052.x.

Laumann, E. O., Nicolosi, A., Glasser, D. B., Paik, A., Gingell, C., Moreira, E., et al. (2005). Sexual problems among women and men aged 40–80 y: Prevalence and correlates identified in the Global Study of Sexual Attitudes and Behaviors. *International Journal of Impotence Research, 17*, 39–57. doi:10.1038/sj.ijir.3901250.

Laumann, E. O., Paik, A., & Rosen, R. C. (1999). Sexual dysfunction in the United States: Prevalence and predictors. *Journal of the American Medical Association, 281*, 537–544.

Leeuw, M., Goossens, M. E. J. B., Linton, S. J., Crombez, G., Boersma, K., & Vlaeyen, J. W. S. (2007). The fear-avoidance model of musculoskeletal pain: Current state of scientific evidence. *Journal of Behavioral Medicine, 30*, 77–94. doi:10.1007/s10865-006-9085-0.

Leiblum, S. R., Koochaki, P. E., Rodenberg, C. A., Barton, I. P., & Rosen, R. C. (2006). Hypoactive sexual desire disorder in postmenopausal women: US results from the Women's International Study of Health

and Sexuality (WISHeS). *Menopause, 13*, 46–56. doi:10.1097/01.gme.0000172596.76272.06.

Líndal, E., & Stefânsson, J. G. (1993). The lifetime prevalence of psychosexual dysfunction among 55 to 57-year-olds in Iceland. *Social Psychiatry and Psychiatric Epidemiology, 28*, 91–95.

Lundqvist, E. N., & Bergdahl, J. (2005). Vestibulodynia (former vulvar vestibulitis): Personality in affected women. *Journal of Psychosomatic Obstetrics and Gynaecology, 26*, 251–256.

Meana, M., Binik, Y. M., Khalife, S., & Cohen, D. R. (1997). Biopsychosocial profile of women with dyspareunia. *Obstetrics and Gynecology, 90*, 583–589. doi:10.1016/S0029-7844(98)80136-1.

Meana, M., & Lykins, A. (2009). Negative affect and somatically focused anxiety in young women reporting pain with intercourse. *Journal of Sex Research, 46*, 80–88. doi:10.1080/00224490802624422.

Moreira, E. D., Hartmann, U., Glasser, D. B., Gingell, C., & GSSAB Investigators' Group. (2005). A population survey of sexual activity, sexual dysfunction and associated help-seeking behavior in middle-aged and older adults in Germany. *European Journal of Medical Research, 10*(10), 434–443.

Nunns, D., & Mandal, D. (1997). Psychological and psychosexual aspects of vulvar vestibulitis. *Genitourinary Medicine, 73*, 541–544.

Nylanderlundqvist, E., & Bergdahl, J. (2002). Vulvar vestibulitis: evidence of depression and state anxiety in patients and partners. *Acta Dermato Venereologica, 83*, 369–373. doi:10.1080/00015550310003764.

Oberg, K., Fugl-Meyer, A. R., & Fugl-Meyer, K. S. (2004). On categorization and quantification of women's sexual dysfunctions: An epidemiological approach. *International Journal of Impotence Research, 16*, 261–269. doi:10.1038/sj.ijir.3901151.

Olsen, L. R., Mortensen, E. L., & Bech, P. (2004). The SCL-90 and SCL-90R versions validated by item response models in a Danish community sample. *Acta Psychiatrica Scandinavica, 110*, 225–229. doi:10.1111/j.1600-0447.2004.00399.x.

Payne, K. A., Binik, Y. M., Amsel, R., & Khalifé, S. (2005). When sex hurts, anxiety and fear orient attention towards pain. *European Journal of Pain, 9*, 427–436. doi:10.1016/j.ejpain.2004.10.003.

Payne, K. A., Binik, Y. M., Pukall, C. F., Thaler, L., Amsel, R., & Khalifé, S. (2007). Effects of sexual arousal on genital and non-genital sensation: A comparison of women with vulvar vestibulitis syndrome and healthy controls. *Archives of Sexual Behavior, 36*, 289–300. doi:10.1007/s10508-006-9089-4.

Pearlin, L. I., & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior, 19*, 2–21.

Reed, B. D., Haefner, H. K., Punch, M. R., Roth, R. S., Gorenflo, D. W., & Gillespie, B. W. (2000). Psychosocial and sexual functioning in women with vulvodynia and chronic pelvic pain. A comparative evaluation. *Journal of Reproductive Medicine, 45*, 624–632.

Rosen, R. C., Fisher, W. A., Eardley, I., Niederberger, C., Nadel, A., Sand, M., et al. (2004). The multinational Men's Attitudes to Life Events and Sexuality (MALES) study: I. Prevalence of erectile dysfunction and related health concerns in the general population. *Current Medical Research and Opinion, 20*, 607–617. doi:10.1185/030079904125003467.

Sackett, S., Gates, E., Heckman-Stone, C., Kobus, A. M., & Galask, R. (2001). Psychosexual aspects of vulvar vestibulitis. *Journal of Reproductive Medicine, 46*, 593–598.

Schmidt, S., Bauer, A., Greif, C., Merker, A., Elsner, P., & Strauss, B. (2001). Vulvar pain. Psychological profiles and treatment responses. *Journal of Reproductive Medicine, 46*, 377–384.

Schmitz, N., Hartkamp, N., Kiuse, J., Franke, G. H., Reister, G., & Tress, W. (2000). The Symptom Check-List-90-R (SCL-90-R): A German validation study. *Quality of Life Research, 9*, 185–193.

Schultz, W. W., Basson, R., Binik, Y., Eschenbach, D., Wesselmann, U., & van Lankveld, J. (2005). Women's sexual pain and its management. *Journal of Sexual Medicine, 2*, 301–316. doi:10.1111/j.1743-6109.2005.20347.x.

Simons, J. S., & Carey, M. P. (2001). Prevalence of sexual dysfunctions: results from a decade of research. *Archives of Sexual Behavior, 30*, 177–219.

Slade, G. D., Diatchenko, L., Bhalang, K., Sigurdsson, A., Fillingim, R. B., Belfer, I., et al. (2007). Influence of psychological factors on risk of temporomandibular disorders. *Journal of Dental Research, 86*, 1120–1125.

Sobhgol, S. S., & Alizadeli Charndabee, S. M. (2007). Rate and related factors of dyspareunia in reproductive age women: A cross-sectional study. *International Journal of Impotence Research, 19*, 88–94. doi:10.1038/sj.ijir.3901495.

Sutton, K. S., Pukall, C. F., & Chamberlain, S. (2009). Pain, psychosocial, sexual, and psychophysical characteristics of women with primary vs. secondary provoked vestibulodynia. *Journal of Sexual Medicine, 6*, 205–214. doi:10.1111/j.1743-6109.2008.01038.x.

ter Kuile, M. M., van Lankveld, J. J. D. M., Vlieland, C. V., Willekes, C., & Weijenborg, P. T. M. (2005). Vulvar vestibulitis syndrome: an important factor in the evaluation of lifelong vaginismus? *Journal of Psychosomatic Obstetrics and Gynaecology, 26*, 245–249.

Twisk, J. W. R. (2003). The problem of evaluating the magnitude of tracking coefficients. *European Journal of Epidemiology, 18*, 1025–1026.

van Lankveld, J. J. D. M., Granot, M., Schultz, W. C. M. W., Binik, Y. M., Wesselmann, U., Pukall, C. F., et al. (2010). Women's sexual pain disorders. *Journal of Sexual Medicine, 7*, 615–631. doi:10.1111/j.1743-6109.2009.01631.x.

van Lankveld, J. J., & Grotjohann, Y. (2000). Psychiatric comorbidity in heterosexual couples with sexual dysfunction assessed with the composite international diagnostic interview. *Archives of Sexual Behavior, 29*(5), 479–498.

van Lankveld, J. J. D. M., Weijenborg, P. T. M., & ter Kuile, M. M. (1996). Psychologic profiles of and sexual function in women with vulvar vestibulitis and their partners. *Obstetrics and Gynecology, 88*, 65–70.

Vodermaier, A., Linden, W., & Siu, C. (2009). Screening for emotional distress in cancer patients: A systematic review of assessment instruments. *Journal of the National Cancer Institute, 101*, 1464–1488. doi:10.1093/jnci/djp389.

Wylie, K., Hallam-Jones, R., & Harrington, C. (2004). Psychological difficulties within a group of patients with vulvodynia. *Journal of Psychosomatic Obstetrics and Gynaecology, 25*, 257–265.

Zeger, S. L., Liang, K. Y., & Albert, P. S. (1988). Models for longitudinal data: a generalized estimating equation approach. *Biometrics, 44*, 1049–1060.